APPROVAL PROCEDURE

FOR

ELECTRONIC REGISTERS AND PRINTERS

DOCUMENT NUMBER
VO-AP-003

VERSION: 00.01

RECORD OF CHANGE

Version	Date	Description
00.01	2005.11.14	Original Release

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1.0 INTRODUCTION

1.1 Purpose

This approval procedure (AP) describes the necessary tests to perform on electronic registers and printers in order to determine the device's compliance with applicable requirements, as provided in the *Weights and Measures Act and Regulations*.

1.2 Scope

This procedure applies to all electronic volumetric meter registers, printers, and indicating elements. The tests verify the proper functioning and accuracy of the registers and printers, as well as the position and size of the registrations.

1.3 Applicable Documents

Document Number	Document Title
	Weights and Measures Act and Regulations Sections R126, R127, R129, R130, R131, R132, R134, R135, R136,R138, R139, R140, R143, R144, R149, R234, R249, R250, R251, R252, R253, R254, R257, R295, SVM-1, SVM-2
GN-LP-003	Vocabulary of Technical and Metrological Terms

1.4 Abbreviations and Symbols

ATC	Automatic Temperature Compensation

2.0 PROCEDURE

2.1 Equipment Requirements

2.1.1 Standards

Standard Number	Description / Performance Requirements
N/A	

2.1.2 Other Equipment

Equipment Description	Performance Requirements
N/A	

2.2 Software Requirements

Software Name	Description / Performance Requirements
N/A	

2.3 Environmental Requirements

Temperature	- 30˚C to 40˚C
Humidity	10% to 95% Relative Humidity
Pressure	N/A

2.4 Safety Requirements

Kindly refer to the applicable Measurement Canada Health and Safety documentation.

2.5 Set-up

N/A

2.6 Instructions

2.6.1 Using the various checklists provided in the Appendices section of this document, verify the device's

compliance with the appropriate section of the *Weights and Measures Act and Regulations.*

2.7 Calculations

2.7.1 Calibration or Approval Calculations

N/A

2.7.2 Measurement Uncertainty Calculations

N/A

2.8 Pass/Fail Criteria

Description	Criteria	Reference	Pass–Fail
General Requirements for Electronic Registers and Printers	Kindly refer to Appendix 3.1 "General Requirements Checklist - Electronic Registers and Printers".	R126, R127, R129, R130, R136, R138, R139, R140, R143, R144, R234, SVM-1	
Electronic Meter Registers	Kindly refer to Appendix 3.2 "Electronic Meter Registers Checklist".	R126, R249, R250, R251, R252, R253, R254, SVM-1	
Electronic Indicators and Printers	Kindly refer to Appendix 3.3 "Electronic Indicators and Printers Checklist".	R130, R135, R149, R257, R295, SVM-1 SVM-2	
Sealing & Means of Adjustment - Electronic Registers	Kindly refer to Appendix 3.4 "Sealing & Means of Adjustment - Electronic Registers Checklist"	SVM-1, SVM-2	

3.0 APPENDICES, WORK SHEETS AND TABLES

3.1 Appendix A

General Requirements Checklist - Electronic Registers and Printers

This checklist applies to all electronic registers and printers submitted for approval.

			Comments
1)	Are the means of registration appropriate for the class, type or design of machine and for its intended service, installation and use? R126	**G** N/A **G** NC **G** C	
2)	Are registrations clear and legible under normal use? R127	**G** N/A **G** NC **G** C	
3)	Does the printed record of the registration on a ticket or form contain the following? R129		
a)	The quantity measured in the transaction, or where permitted, the start and finish print such that the quantity measured can be calculated? R129(a)	**G** N/A **G** NC **G** C	
b)	The unit price of the commodity when the computed price is shown? R129(b)	**G** N/A **G** NC **G** C	
c)	The name, symbol or abbreviation of the unit of measurement registered, and as applicable, of the price? R129(c)	**G** N/A **G** NC **G** C	
4)	Is there a visual or printed indication that the device has been properly returned to the start position before any commodity is measured? R130	**G** N/A **G** NC **G** C	
5)	Are digital registrations suitably identified by figures, words, symbols or combination thereof? R136	**G** N/A **G** NC **G** C	
6)	Is the device capable of repeating its registrations for each identical quantity delivered, within the limits of repeatability required by the Regulations? R138	**G** N/A **G** NC **G** C	

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General Requirements Checklist - Electronic Registers and Printers (continued)

			Comments
7)	For machines with two or more means of registration of the same units:		
a)	Are all digital registrations having the same units of measurement in exact agreement? R139(a)	**G** N/A **G** NC **G** C	
b)	Is any mechanical digital registration in agreement with any other digital registration within 0.6 times the value of the smallest mechanical digital increment or 0.6 times the value of the smallest other digital increment, whichever represents the larger quantity? R139(b)	**G** N/A **G** NC **G** C	
c)	Are analogue registrations in agreement with other analogue registrations within ¼ of finest graduation? R139(c)	**G** N/A **G** NC **G** C	
d)	Is any digital registration in agreement with any analogue registration within 0.6 times the value of the smallest digital increment or 0.6 times the value of the smallest analogue graduation, whichever represents the larger quantity? R139(d)	**G** N/A **G** NC **G** C	
8) a)	Are registrations of monetary value in mathematic agreement with registrations of unit price and quantity indication? R140	**G** N/A **G** NC **G** C	
b)	Does the machine have words or symbols to differentiate clearly between the monetary value and the quantity registrations? R140	**G** N/A **G** NC **G** C	
9)	Is the primary indicator or secondary indicator located so that it may be easily read by any interested party? R143	**G** N/A **G** NC **G** C	
10)	Is the primary indicator located to allow an unobstructed view of the delivery outlet? R144	**G** N/A **G** NC **G** C	
11)	Is the movable capacity indicator and all means of adjustment sealable? R234	**G** N/A **G** NC **G** C	

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General Requirements Checklist - Electronic Registers and Printers (continued)

			Comments
12)	Does every registration, other than a registration of a non-resettable register, have at least the following number of digits and not more than the following minimum increment: SVM1-20		
a)	four digits and 0.001 L or 0.0001 gallons, in the case of registers used with meters with a maximum flow rate of 5 L/min? SVM1-20(a)	**G** N/A **G** NC **G** C	
b)	five digits and 0.001 L or 0.0001 gallons, in the case of registers used with meters with a maximum flow rate of 20 L/min? SVM1-20(b)	**G** N/A **G** NC **G** C	
c)	five digits and 0.01 L or 0.001 gallons, in the case of registers used with meters with a maximum flow rate of 115 L/min? SVM1-20(c)	**G** N/A **G** NC **G** C	
d)	five digits and 0.1 L or 0.01 gallons, in the case of registers used with meters with a maximum flow rate of 500 L/min? SVM1-20(d)	**G** N/A **G** NC **G** C	
e)	five digits and 1.0 L or 0.1 gallons, in the case of registers used with meters with a maximum flow rate above 500 L/min? SVM1-20(e)	**G** N/A **G** NC **G** C	
13)	Does the total price registration have sufficient digits so that the total price computed agrees to the nearest cent with the product of the displayed unit price and quantity registered? SVM 1-21	**G** N/A **G** NC **G** C	
14)	Where applicable, is the non-resettable register designed so that it does not reset before 90 days with the meter running continuously at it's maximum rated capacity? SVM 1-22	**G** N/A **G** NC **G** C	
15)	Does the register and ancillary equipment remain within the applicable limits of error under the following conditions:		
a)	temperature range of -30˚C to 40˚C or temperatures specified by the manufacturer and marked on the name plate? SVM1-29(a)	**G** N/A **G** NC **G** C	
b)	relative humidity of 10% to 95%? SVM1-29(b)	**G** N/A **G** NC **G** C	

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3.2 Appendix B

Electronic Meter Registers Checklist

This checklist applies to Meter Registers - Electronic type			Comments
1)	Are the means of registration appropriate for the class, type or design of machine and for its intended service, installation and use? R126	**G** N/A **G** NC **G** C	
2)	Does the register advance only when product is delivered through the meter? R249(1)	**G** N/A **G** NC **G** C	
3)	If the register is reset to zero by advancement of the register elements:		
a)	Are the elements obscured until the zero position is reached? R249(2)(a)	**G** N/A **G** NC **G** C	
or			
b)	Is the advancing movement continuous until the zero position is reached? R249(2)(b)	**G** N/A **G** NC **G** C	
4) a)	If designed to measure flow in both directions, does the register advance or reverse according to the flow of liquid? R250	**G** N/A **G** NC **G** C	
b)	Is the direction of flow continuously indicated? SVM1-26	**G** N/A **G** NC **G** C	
5)	Is the totalizer and/or preset register clearly differentiated from the delivery register? R251	**G** N/A **G** NC **G** C	
6)	Do all transactional indicators accurately return to zero at the same time? R252	**G** N/A **G** NC **G** C	
7)	Is the unit price, at which the register is set to compute, displayed and prevented of change during a delivery? R253	**G** N/A **G** NC **G** C	
8)	After a transaction and prior to returning to zero is the register inoperable? R254	**G** N/A **G** NC **G** C	

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Electronic Meter Registers Checklist (continued)

			Comments
9)	In the event of a power outage, does a register that operates from the main power supply continue to function for a period of at least:		
a)	24 hours, where a back-up power supply that automatically recharges on restoration of power is used? SVM1-23(a), SVM1-25	**G** N/A **G** NC **G** C	
b)	7 days, where any other type of back-up power supply is used? SVM1-23(b), SVM1-25	**G** N/A **G** NC **G** C	
10) a)	If the power supply of a non-resettable register requires periodic replacement, such as a battery, does it indicate low power at least 90 days before power failure? SVM1-24(1)	**G** N/A **G** NC **G** C	
b)	Is the register designed such that the replacement of the power source will not effect the programming and metering information, or the device operation? SVM1-24(2)	**G** N/A **G** NC **G** C	
11)	In the event of a power outage:		
a)	Does the resettable register retain programming and metering information for the period set out in section 9 above? SVM1-25(b)	**G** N/A **G** NC **G** C	
b)	Does the resettable register display the quantity, and where provided, the unit price and total price at any time up to 15 minutes after the power outage? SVM1-25(b)	**G** N/A **G** NC **G** C	

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Operator: _____ **Device:** _____

3.3 Appendix C

Electronic Indicators and Printers Checklist

This checklist applies to electronic indicators and printers

			Comments
1)	Is there a visual or printed indication that the device has been properly returned to the start position before any commodity is measured? R130	**G** N/A **G** NC **G** C	
2) a)	Are all digits (of the same function) of acceptable size and spacing? R135(a)	**G** N/A **G** NC **G** C	
b)	Are the digits representing a decimal submultiple of the unit set apart by a decimal point or comma? R135(b)	**G** N/A **G** NC **G** C	
c)	Is the brightness of the electronically displayed digits such that they may be easily read under normal conditions of use? R135(c)	**G** N/A **G** NC **G** C	
3)	Is the ticket, card or other blank or pre-printed form used with a printer appropriate to that printer? R149	**G** N/A **G** NC **G** C	
4)	May a jammed ticket be removed without breaking the inspection seal on the meter registration adjustment? R257	**G** N/A **G** NC **G** C	
5)	If the meter is equipped with ATC does the ticket indicate that the volume has been adjusted to correspond to an equivalent volume at a standard condition stated on the ticket? R295	**G** N/A **G** NC **G** C	

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Electronic Indicators and Printers Checklist (continued)

			Comments
6)	Does the printed ticket provide the following information:		
a)	The name and address of the trader? SVM1-27(a)	**G** N/A **G** NC **G** C	
b)	Some indication of where the meter is installed (address or vehicle number)? SVM1-27(b)	**G** N/A **G** NC **G** C	
c)	The identification number of the metering system where more than one assembly is installed at the same location? SVM1-27(c)	**G** N/A **G** NC **G** C	
d)	The date of delivery of the commodity? SVM1-27(d)	**G** N/A **G** NC **G** C	
7)	When used in a system equipped with ATC, is the register inoperable if the electrical circuit to the temperature sensor is shorted or incomplete? SVM2-11	**G** N/A **G** NC **G** C	
8)	When used in a system equipped with ATC, does the printed ticket provide the gross metered volume, net compensated volume, and the relative density used to determine the volume correction factor? SVM2-14	**G** N/A **G** NC **G** C	

Date: _____ **Project #:** _____

Operator: _____ **Device:** _____

3.4 Appendix D

Electronic Registers - Sealing and Means of Adjustment Checklist

This checklist applies to electronic indicators and printers		Comments
1) Does any means of adjustment accessible without the removal of a portion of the exterior housing of the register:		
a) Have an adjustment range less than ±2% of the volume of liquid to be delivered? SVM1-9(a)	**G** N/A **G** NC **G** C	
b) Is sealable? SVM1-9(b)	**G** N/A **G** NC **G** C	
c) Not adjustable while the register is operating? SVM1-9(c)	**G** N/A **G** NC **G** C	
2) Does the electronic calibrator that automatically selects a pre-determined meter factor corresponding to the rate of flow to linearize the meter accuracy / flow rate performance curve agree with the following:		
a) Starting from the lowest programmed flow rate factor and progressing to the highest programmed flowrate factor; are the factors prevented from deviating from the previous one more than ±0.25%? SVM 1-10(a)	**G** N/A **G** NC **G** C	
b) Are the programmed values readily verifiable? SVM1-10(b)	**G** N/A **G** NC **G** C	
3) If the register incorporates ATC, is any means of adjusting the ATC sealable and located so as to be inaccessible without the removal of a portion of the exterior housing of the device containing the ATC? SVM2-7	**G** N/A **G** NC **G** C	

Date: _____ **Project #:** _____

Operator: _____ **Device:** _____